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Europäisches  
Patentamt

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abteilung

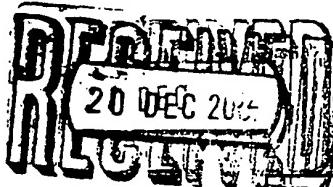
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Zeichen/Ref./Réf. AFB/JAS/P8929EP	Anmeldung Nr./Application No./Demande n°./Patent Nr./Patent No./Brevet n°. 02255310.1-2301-
Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire AIR PRODUCTS AND CHEMICALS, INC.	

## COMMUNICATION

The European Patent Office herewith transmits as an enclosure the European search report for the above-mentioned European patent application.

If applicable, copies of the documents cited in the European search report are attached.

- Additional set(s) of copies of the documents cited in the European search report is (are) enclosed as well.

The following specifications given by the applicant have been approved by the Search Division:

abstract       title

- The abstract was modified by the Search Division and the definitive text is attached to this communication.

The following figure will be published together with the abstract:

3

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## REFUND OF THE SEARCH FEE

If applicable under Article 10 Rules relating to fees, a separate communication from the Receiving Section on the refund of the search fee will be sent later.





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 4 565 216 A (MEIER WERNER) 21 January 1986 (1986-01-21) * column 2, line 26-64 - column 4-5; figures 2,3 *	1-31	F25J3/02 B01D3/00
D,X	US 6 338 774 B1 (LEHMAN JEAN-YVES) 15 January 2002 (2002-01-15) * column 5, line 52 - column 6, line 26; figure 7 *	1-27, 30, 31	
X	US 6 395 138 B1 (DARREDEAU BERNARD ET AL) 28 May 2002 (2002-05-28) * column 4, line 9-27; figures 1,2 *	1-27, 30, 31	
X	US 6 294 053 B1 (DARREDEAU BERNARD) 25 September 2001 (2001-09-25) * column 3, line 20 - column 4, line 67; figures 3,4 *	1-27, 30, 31	
D,A	EP 0 930 088 A (AIR PROD & CHEM) 21 July 1999 (1999-07-21) * paragraphs '0012!-'0018!; figures *	1-31	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	DE 11 13 680 B (HYDROCARBON MINERALOEL G M B H) 14 September 1961 (1961-09-14) * the whole document *	1-31	F25J B01D
The present search report has been drawn up for all claims			
3	Place of search  MUNICH	Date of completion of the search  4 December 2002	Examiner  Göritz, D
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			



European Patent  
Office

LACK OF UNITY OF INVENTION  
SHEET B

Application Number

EP 02 25 5310

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-27, 30, 31

Apparatus for liquid-vapour separation processes comprising, in fluid communication, a liquid distributor and a liquid-vapour separation column tilttable from the vertical.

2. Claims: 28, 29

A liquid distributor comprising a primary distributor zone and at least one secondary distributor, wherein the total cross sectional area of said primary distributor zone defined by the outer periphery thereof is less than the corresponding cross sectional area of the or each secondary distributor.



### CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
  
- No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

### LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
  
- None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 02 25 5310

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

04-12-2002

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

**EP 02 25 5310**

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## ABSTRACT / ZUSAMMENFASSUNG / ABREGE

02255310.1

Liquid is distributed substantially uniformly in a liquid-vapour separation column located on an off-shore floating platform such as a ship using a liquid distributor comprising a primary distribution zone (18) and at least one secondary distributor (20), the primary distribution zone being in fluid communication with the or each secondary distributor (28) and the or each secondary distributor having a plurality of liquid distribution apertures (36) providing said fluid communication between the liquid distributor and the column. The liquid distributor is characterised in that:

- i) The distance between the two apertures that are furthest apart in the or each secondary distributor (the "characteristic length") is such that the liquid distributor provides, at each angle of tilt, a standard deviation of liquid flow rates through the apertures of the or each secondary distributor that is less than a first predetermined maximum for all angles of tilt; and
- ii) the difference in flow rate between the aperture having maximum liquid flow and the aperture having minimum liquid flow in the or each secondary distributor at each angle of tilt is less than a second predetermined maximum for all angles of tilt,

said first and second predetermined maxima being determined by the required degree of liquid-vapour separation. An advantage of such a liquid distributor is that liquid can be distributed substantially uniformly when the column is tilted.